REMARKS

This application has been reviewed in light of the non-final Office Action mailed on December 2, 2008. Claims 1-10 are pending in the application with Claims 1, 8, and 9 being in independent form. By the present amendment, Claims 1, 8, and 9 have been amended and Claim 10 has been cancelled. No new matter or issues are believed to be introduced by the amendments.

In the Office Action Claims 9 and 10 were rejected under 35 U.S.C. Section 101. Claim 9 has been amended in a manner which is believed to be directed to statutory subject matter. Claim 10 has been cancelled. Accordingly, withdrawal of the rejection is respectfully requested.

Claims 1-5, and 7-10 were rejected under 35 U.S.C. §103(a) as being unpatentable over Balan et al. (USP 7,158,933 B2) and Shozakai et al. (USP 7,440,891 B1). Claim 10 has been cancelled. The rejection is respectfully traversed. However, additional limitations were added to the independent claims to better recite Applicant's claimed subject matter.

Claim 1, as amended herein, recites, *inter alia*, as follows:

> "Audio enhancement system, comprising a signal input for carrying a distorted desired signal z, a reference signal input, and a spectral processor coupled to both signal inputs for processing the distorted desired signal by means of a reference signal x acting as an estimate for the distortion of the desired signal, characterized in that the spectral processor is equipped for said processing **such that a factor C' is determined, whereby said estimate is a function of C' times the spectral power of the reference signal, and the factor C' is determined as the spectral ratio between those components of the signals z and x**, which are essentially stationary with time, **wherein signal z includes both a desired signal and a noise signal, and signal x includes only the noise signal**." (emphasis added)

The applied combination of Balan et al. and Shozakai et al. fail to disclose or suggest at least "...such that a factor C' is determined, whereby said estimate is a function of C' times the spectral power of the reference signal, and the factor C' is determined as the spectral ratio

between those components of the signals z and x..." and "...wherein signal z includes both a desired signal and a noise signal, and signal x includes only the noise signal, and wherein the desired signal can be a desired speech signal," as recited in amended independent Claim 1.

In the present disclosure, and in contrast with the teachings of the cited references, the input signal z indicates a distorted desired signal. It comprises the sum of the desired signal, generally in the form of speech, and distortions, such as noise, echoes, competing speech or reverberation of the desired signal. The signal x indicates a reference or noise signal from which an estimate of the distortion in the distorted desired signal z is to be derived. The signals z and x may originate from one or more microphones 2, as shown in FIGS. 1 and 2. In a multi-microphone audio enhancement system 1 there are two or more separate microphones 2, to derive the reference signal from one or more microphones.

The signal x only includes the reference or noise signal, whereas the signal z includes both the desired signal and the noise signal. FIG. 2 shows an embodiment of the audio enhancement system 1 for the case wherein the microphones 2 both sense speech and noise through microphone array signals u_1 and u_2. A filter and sum beamformer 3 is now coupled between the microphones 2 and the spectral processor SP. Again, the spectral processor SP receives the above described signals z and x, with the signal x only comprising the reference or noise signal, and the signal z comprising both the desired and noise signals. The design of such a beamformer 3 is such that through respective transfer functions $f_1(w)$ and $f_2(w)$ the distorted desired signal z is obtained by a linear combination of the microphone array signals u_1 and u_2 respectively. The reference signal x is derived by a blocking matrix B(w) from the respective microphone array signals for projecting these signals into a subspace that is orthogonal to the desired signal. Ideally, output signal x of the matrix B(w) does not contain the desired speech

but only distortions. Next, the signals z and x are fed to the spectral processor SP for spectrally processing the distorted desired signal z by means of the reference signal x. The signal q from the processor SP is an output signal which is virtually free of distortion. It holds that q=G x z, where G is a gain function.

Independent Claims 8 and 9 include similar limitations to those of Claim 1, and are allowable over the prior art of record for at least the same reasons presented above for the patentablity of independent Claim 1.

Accordingly, the withdrawal of the rejection under 35 U.S.C. §103(a) with respect to independent Claims 1, 8, and 9 and allowance thereof is respectfully requested.

Dependent Claims 2-7 are allowable over the prior art of record for at least the same reasons presented above for the patentablity of independent Claim 1. Accordingly, the withdrawal of the rejection under 35 U.S.C. §103(a) with respect to Claims 2-7 and allowance thereof are respectfully requested.

Claim 6 was rejected under 35 U.S.C. §103(a) as being unpatentable over Balan et al. and Shozakai et al. and Suzuki et al. (USP 6,108,428).

Suzuki et al. does not address the deficiencies of Balan et al. and Shozakai et al. Moreover, dependent Claim 6 is allowable over the prior art of record for at least the same reasons presented above for the patentablity of independent Claim 1. Accordingly, the withdrawal of the rejection under 35 U.S.C. §103(a) with respect to dependent Claim 6 and allowance thereof are respectfully requested.

In view of the foregoing amendments and remarks, it is respectfully submitted that all Claims presently pending in the application, namely, Claims 1-9, are believed to be in condition for allowance.

If the Examiner should have any questions concerning this communication or feels that an interview would be helpful, the Examiner is requested to contact the undersigned.

Respectfully submitted,

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